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UNITED STATES DEPARTMENT OF AGRICULTURE.
BUREAU OF ENTOMOLOGY.
WASHINGTON, D. C.

FOREST ENTOMOLOGY.

PROJECT 15a - ROGUE RIVER AREA, OREGON.

A QUANTITATIVE REPORT OF DENDROCTONUS BREVICOMIS IN YELLOW PINE.

A THIRD SUPPLEMENTARY REPORT.

Data for 1921 and Outline of the History of the Epidemic From 1914 to 1921 Inclusive.

Ashland, Oregon.
March 5,
1923.

PROJECT 15a - ROGUE RIVER AREA, OREGON.

AN EPIDEMIC OF DENDROCTONUS BREVICOMIS IN YELLOW PINE.

OUTLINE OF HISTORY OF THE EPIDEMIC TO DATE:

1 - INTRODUCTION:

A quantitative study of an epidemic infestation of Dendroctonus brevicomis in yellow pine in the Rogue River Area of southern Oregon was undertaken by the Ashland Station in 1914. Owing to the value of the study and the probable applicability of its results to other areas of infestation it has been continued every year since 1914 and is, at this date, still under way.

The following report of the progress and status of the Dendroctonus brevicomis infestation on the area is submitted in accordance with the plan adopted in 1919 for subsequent studies of this project. The present paper is the third supplementary report provided for in these plans and follows the previous reports submitted, namely:

Preliminary Report - March 1918.
Progress Report - March 15, 1919.
First Supplementary Report - March 15, 1921.
Second Supplementay Report - Feb 3, 1922.

The information compiled in these reports has been secured by making annual surveys of the project area. A list of parties contributing this information is herewith given with the periods of their observations:

J. M. Miller - 1914 to 1917 Incl.
F. P. Keen - 1914 to 1916 Incl.
J. D. Riggs - 1915.
W. E. Glendinning - 1915 to 1917 Incl.
A. W. Wagner - 1916 to 1918 Incl.
P. D. Sergent - 1914 to 1921 Incl.
J. E. Patterson - 1914 to 1921 Incl.

2 - Location of Area:

The area is located on the north slopes of the Siskiyou mountains in Jackson County Oregon. The attached map shows the location of the area and its position in the surrounding country.

3 - Extent of Area:

In extent it approximates 50,000 acres with a stand of 155,800 M.B.M. of yellow pine timber.

4 - Timber Resources Involved:

The character of the timber is medium grade but owing to its accessibility to nearby centers of population it is of rather high merchantible value. Some cutting in local stands has been going on for years but it will probably be 10 to 15 years before extensive cutting will have greatly depleted the stands. The timber is a mixed type of yellow pine, Douglas fir, white fir, and a small percentage of sugar pine. The value of the pine is probably $3.50 per M. The ownership is divided between hundreds of small private owners. No large tracts of single owehership is involved.

5 - Cause of the Epidemic:

A satisfactory cause for the epidemic is not known as no data previous to the inception of the study are available.

6 - Cycle of the Epidemic:

The following tables and attached graphs illustrate the cycles of the epidemic from 1914 to 1921 inclusive on the area and on each of the separate units very clearly.

7 - Decline of the Epidemic:

The epidemic has been declining since 1916, and is now, at the close of 1921, in about the same status as it was in 1914 at the inception of the study. This decline has not been gradual but has fluctuated from year to year. Neither has it shown analogy in the different units as will be apparent by refering to the graphs.

The causes of the decline are not well understood. One contributing factor of perhaps more or less value is natural control caused by insect enemies of the barkbeetles. Our knowledge of this subject is at present very meagre although some data is in hand and it is hoped that additional data will be secured before the project is terminated.

Table No. I - Showing Volume and Percent of Stand Killed Annually by Dendroctonus brevicomis on the Rogue River Area During the Period 1914 to 1921 Inclusive.

Year of loss	Number of trees	Total Volume in board feet	Percent of stand	Percent of increase or decrease over preceding year	
				Increase	Decrease
1914	369	346,390	.2		
1915	1,857	1,615,940	1.	366%	
1916	1,630	1,383,480	.9		14.4%
1917	803	608,005	.4		56 %
1918	1,187	1,085,315	.7	78%	
1919	780	674,270	.45		37%
1920	609	462,050	.35		31%
1921	383	283,440	.18		38%
Totals	7,618	6,458,890	4.2		

DATA FOR 1921.

This section of the present paper submits the data for 1921 and brings the study to date. These data were secured by making an extensive survey of the area and checking and revising the results by factors obtained from intensive surveys of the Mistletoe, Lambs, Ashland, and Frederick Units.

With the addition of the 1921 data to that already in hand the cycle of the infestation on the area is complete to and including the year 1921. Table No. I shows the progress of this infestation on the entire area during the period 1914 to 1921 inclusive.

Table No. II shows the progress or cycle of the annual infestations on each unit of the area during the same period.

CONCLUSION:

The study of the infestations on the Rogue River Area has resulted in the accumulation of important data on the progress of Dendroctonus brevicomis infestations on an uncontrolled area. It has made possible the diagraming of the primary and secondary infestation cycles during a period of eight years and has contributed in a large measure to our knowledge of the history of infestations on areas where only natural control factors prevail.

It is believed that additional data of value can be secured by continueing the study for at least two more years or until there is evidence of a pronounced increase in the infestation similiar to the increase in 1915. Therefore it is recommended that the study be continued on the smae plan that has been used since 1919 - i.e. by

TABLE NO. II - Cycle of Dendroctonus brevicomis infestation in yellow pine on the separate units of the Rogue River Area from 1914 to 1921.

Unit	Year of	Number trees	Volume in board feet	% of pine stand	Percent of increase or decrease over preceding year	
					Increase	Decrease
Mistletoe	1914	23	34,900	.1		
	1915	130	140,660	.4	303%	
	1916	205	223,440	.6	59%	
	1917	125	87,260	.2		60%
	1918	469	429,650	1.2	392%	
	1919	244	245,330	.8		43%
	1920	168	129,080	.4		47%
	1921	115	103,500	.3		20%
Totals		1,499	1,393,820	3.9		
Lamb's	1914	56	56,190	.4	250%	
	1915	254	208,770	1.4	273%	
	1916	169	108,430	.7		48%
	1917	63	39,010	.2		64%
	1918	82	69,590	.4	79%	
	1919	46	31,550	.2		53%
	1920	18	14,520	.1		54%
	1921	24	20,450	.1	41%	
Totals		712	548,510	4.2		
Ashland	1914	45	56,250	.2		
	1915	213	226,820	1.	316%	
	1916	379	311,050	1.4	37%	
	1917	146	114,590	.5		63%
	1918	202	199,130	.9	74%	
	1919	46	38,800	.2		80%
	1920	12	12,960	.06		66%
	1921	13	11,700	.05		9%
Totals		1,056	671,300	4.41		
Frederick	1914	16	22,400	.7		
	1915	60	80,800	3.	261%	
	1916	89	87,530	3.	8%	
	1917	68	52,800	2.		37%
	1918	57	46,915	1.7		11%
	1919	44	35,200	1.2		25%
	1920	13	15,730	.6		55%
	1921	5	4,250	.15		73%
Totals		352	345,625	12.15		
Wagner	1914	50	50,400	.2		
	1915	285	339,840	1.3	574%	
	1916	286	303,890	1.		11%
	1917	130	138,150	.4		60%
	1918	175	212,430	.6	54%	
	1919	142	166,850	.5		21%
	1920	78	84,240	.2		50%
	1912	44	39,600	.1		53%
Totals		1,188	1,335,400	4.		
Coleman	1914	70	77,000	.3		
	1915	345	323,250	1.2	297%	
	1916	184	155,040	.6		52%
	1917	95	93,100	.3		40%
	1918	70	70,000	.2		25%
	1919	78	74,100	.2	6%	
	1920	52	29,640	.1		60%
	1921	30	18,540	.05		40%
Totals		924	840,670	2.95		
Griffin	1914	35	35,250	.3		
	1915	230	221,000	2.2	539%	
	1916	176	167,300	1.6		24%
	1917	93	66,490	.6		60%
	1918	52	41,600	.4		37%
	1919	72	57,600	.5	38%	
	1920	40	22,800	.2		60%
	1921	42	30,400	.25	33%	
Totals		740	640,440	6.35		
Gold Ray	1914	80	16,000	.1		
	1915	340	74,800	.7	367%	
	1916	142	26,800	.3		84%
	1917	83	16,600	.1		38%
	1918	80	16,000	.1		4%
	1919	108	24,840	.2	55%	
	1920	60	24,000	.2		3%
	1921	110	55,000	.6	56%	
Totals		1,003	254,040	2.6		
Total for Area		7,618	6,458,890	4.2		

making annual surveys of the area and checking the results of the survey by in all units by factors obtained through intensive cruises of the three southern units.

BIBLIOGRAPHY:

The following reports and papers have been submitted to the Forest Entomologist, Dr. A. D. Hopkins. Copies of these reports are on file in the Ashland Station.

1 - A Quantitative Study of Depredations by Dendroctonus Beetles in the Rogue River Area. by J. M. Miller, Feb 1918.

2 - Progress Report - Data for 1917 and 1918. by J. M. Miller, March 1919.

3 - First Supplementary Report of Progress - Data for 1919. by J. E. Patterson, Feb 1921.

4 - Second Supplementary Report of Progress - Data for 1920. by J. E. Pat erson, Feb 1922.

Respectfully submitted.

In Charge Ashland Station.

Ashland, Oregon.
March 5, 1923.

EXPLANATION OF DIAGRAMS.

Diagrams I and II -

These charts show diagrammatically the annual and total Dendroctonus brevicomis losses in board feet in yellow pine and percentage of stand killed in each unit and on the entire area during the period of the study to date: 1914 to 1921 inclusive. It will be noted that at the beginning of the study in 1914 the infestation was endemic but became epidemic early in 1915 and the cycle reached its maximum during this season and in 1916. A decline commenced in 1916 and in 1917 the infestation was again at a low point. In general the 1918 infestation showed and increase over 1917, this increase was more apparent in the Mistletoe, Lamb's, and Ashland Units. The increase in the 1918 infestation in these units was due primarily to the Siskiyou and Mistletoe burns which occurred in the Mistletoe unit in the late fall of 1917 and in August 1918. The influence of these fires was local and did not extend to the more remote parts of the area. It will be noted that, following the season of 1918, the infestation on the area gradually decreased until at the close of the 1921 season it was again near the low point recorded in 1914.

Diagram III -

This chart shows the percentage of the yellow pine stand killed annually by D. brevicomis on the area during the period 1914 to 1921 inclusive, and also the total percentage killed during this period on each of the eight units.

Diagram IV -

This chart shows the annual fluctuations of the infestation cycles during the period 1914 to 1921 inclusive. It also shows the accumulated annual losses (shown in percentage of stand killed) during this period. It will be noted that the curve of the annual losses describes two complete infestation cycles during the period of eight years. While the infestations of the second cycle (described in 1918, 1919, and 1920) did not, in any year, reach the high point described in 1915 by the curve of the first cycle it is nevertheless a complete cycle. This would indicate that during the seven year period, from 1914 to 1920, the infestation on the Rogue River area passed through two distinct cycles and was at the close of the 1921 season in about the same relative status as the infestation in 1914. This low point may be succeeded by a rapid increase in 1922 or 1923 similiar to the increase which occurred in 1915. However this will be determined after the 1922 and 1923 data is secured.

The diagram also shows the low point of the cycles where the annual losses do not exceed one-half of one percent of the stand. When these conditions prevail the annual loss is compensated by the annual increment of growth and the infestation does not result in a final reduction of the stand. It will be noted that the infestation during both cycles passed this point during the seasons of 1915, 1916, and 1918. With the exception of these three seasons the annual losses during the entire period were well below this point of endemic infestations. This chart shows that the accumulated losses on the area amounted to 4.2% of the stand during the eight year period of the study.